

CLAIMS

1. Apparatus comprising:

an optical fiber; and

a chip-level optical transceiver carried by a bench disposed in a tilted state aligning the chip-level optical transceiver with the optical fiber.

2. Apparatus of claim 1, further comprising a package securing and containing the optical fiber, the bench, and the chip-level optical transceiver carried by the bench.

3. Apparatus of claim 2, wherein the package comprises:

a support structure securing the fiber;

a header coupled to the support structure; and

the bench carried by the header in front of the optical fiber.

1        4.    Apparatus of claim 3, wherein the package  
2 hermetically seals the bench and the chip-level optical  
3 transceiver carried thereby.

4

5        5.    Apparatus of claim 1, wherein the chip-level optical  
6 transceiver comprises:

7

8            a light emitting device, having an output, for  
9 emitting a first wavelength of light along a first  
10 optical path;

11

12           a first photodiode for controlling the output of the  
13 light emitting device;

14

15           a second photodiode having an active region;

16

17           a lens for receiving the first wavelength of light  
18 along the first optical path from the light emitting  
19 device and collimating the first wavelength of light to  
20 the second photodiode along the first optical path; and

1           the second photodiode for reflecting the first  
2   wavelength of light along the first optical path into the  
3   optical fiber along a second optical path.

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5       6.   Apparatus of claim 5, further comprising:

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7           the optical fiber for transmitting a second  
8   wavelength of light to the second photodiode along the  
9   second optical path; and

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11          the second photodiode adapted and arranged to permit  
12   the second wavelength of light to pass therethrough to  
13   the active region thereof for conversion into an  
14   electrical signal.

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16       7.   Apparatus of claim 6, wherein the first wavelength  
17   of light is different from the second wavelength of light.

1        8.    Apparatus comprising:

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3            an optical fiber;

4

5            a header mounted adjacent the optical fiber; and

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7            a chip-level optical transceiver supported by a

8        bench carried by the header in a tilted state aligning

9        the chip-level optical transceiver components with the

10       optical fiber.

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12       9.    Apparatus of claim 8, further comprising:

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14           a support structure securing the fiber; and

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16           the header coupled to the support structure.

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18       10.   Apparatus of claim 9, wherein the support structure

19       and the header cooperate to hermetically seal the bench and

20       the chip-level optical transceiver carried thereby.

1        11. Apparatus of claim 8, wherein the chip-level optical  
2 transceiver comprises:

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4            a light emitting device, having an output, for  
5 emitting a first wavelength of light along a first  
6 optical path;

7

8            a first photodiode for controlling the output of the  
9 light emitting device;

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11           a second photodiode having an active region;

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13           a lens for receiving the first wavelength of light  
14 along the first optical path from the light emitting  
15 device and collimating the first wavelength of light to  
16 the second photodiode along the first optical path; and

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18           the second photodiode for reflecting the first  
19 wavelength of light along the first optical path into the  
20 optical fiber along a second optical path.

1        12. Apparatus of claim 11, further comprising:

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3            the optical fiber for transmitting a second  
4        wavelength of light to the second photodiode along the  
5        second optical path; and

6

7            the second photodiode adapted and arranged to permit  
8        the second wavelength of light to pass therethrough to  
9        the active region thereof for conversion into an  
10       electrical signal.

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12        13. Apparatus of claim 12, wherein the first wavelength  
13       of light is different from the second wavelength of light.

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15        14. Apparatus of claim 12, wherein the first optical  
16       path is coincident to the second optical path.

1        15. Apparatus comprising:

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3            a package including a header;

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5            an optical fiber extending into the package, and

6        secured thereby adjacent the header; and

7

8            a chip-level optical transceiver supported by a

9        bench carried by the header in a tilted state aligning

10       the chip-level optical transceiver components with the

11       optical fiber.

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13       16. Apparatus of claim 15, wherein the package

14       hermetically seals the bench and the chip-level optical

15       transceiver carried thereby.

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17       17. Apparatus of claim 15, wherein the chip-level

18       optical transceiver comprises:

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20            a light emitting device, having an output, for

21        emitting a first wavelength of light along a first

22        optical path;

1           a first photodiode for controlling the output of the  
2   light emitting device;

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4           a second photodiode having an active region;

5  
6           a lens for receiving the first wavelength of light  
7   along the first optical path from the light emitting  
8   device and collimating the first wavelength of light to  
9   the second photodiode along the first optical path; and

10  
11          the second photodiode for reflecting the first  
12   wavelength of light along the first optical path into the  
13   optical fiber along a second optical path.

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15   18. Apparatus of claim 17, further comprising:

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17          the optical fiber for transmitting a second  
18   wavelength of light to the second photodiode along the  
19   second optical path; and

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21          the second photodiode adapted and arranged to permit  
22   the second wavelength of light to pass therethrough to



1       the active region thereof for conversion into an  
2       electrical signal.

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4       19. Apparatus of claim 18, wherein the first wavelength  
5       of light is different from the second wavelength of light.

6

7       20. Apparatus of claim 18, wherein the first optical  
8       path is coincident to the second optical path.